

UNITED STATES PATENT APPLICATION

for

STOPPER DEVICE FOR CONTAINERS, SUCH AS CYLINDERS,  
EQUIPPED WITH A NECK OF THE WATER FOUNTAIN TYPE

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**STOPPER DEVICE FOR CONTAINERS, SUCH AS CYLINDERS, EQUIPPED  
WITH A NECK OF THE WATER FOUNTAIN TYPE**

**BACKGROUND OF THE INVENTION**

**Field of the Invention**

[0001] The present invention relates to a stopper device for containers such as cylinders having a neck adapted for use with water fountains or dispensers.

**Description of the Related Art**

[0002] Typically, water is dispensed in offices and businesses by refrigerated water fountains or dispensers commonly referred to as “water-coolers.” The water is delivered in containers, e.g., cylinders, and installed on the water fountain by placing it upside down.

[0003] A stopper device is placed on the cylinder for sealing purposes. Stopper devices are already known, for example from European patent number 641713 of ELKAY and from French patent number 2769004 of RICAL. The stopper devices include a plastic capsule containing an external skirt serving as a receptacle for the neck of the cylinder and, an internal duct for the passage of a fountain dispensing tube.

[0004] The stopper in each of these patents consists of a movable cap. The cap is separated by breakage in the ELKAY patent.

[0005] In the RICAL patent, the cup-shaped stopper is a cap, which is displaced between the duct and the head of the tube. Moreover, the cap fits into the free end of the duct during the storage or transport of the liquid. When the fountain dispensing tube is slipped into the duct, the tube’s head pushes the cap toward the top of the duct to detach it from the duct and fit onto the head of the tube.

[0006] A problem with the stopper system of RICAL is that if the cap malfunctions because it does not arrive at its proper location, the cap can fall accidentally to the bottom of the cylinder. As a result, the neck of the cylinder remains accessible and in

communication with the external surroundings, thus risking contamination.

## **SUMMARY OF THE INVENTION**

[0007] A stopper device must be compatible with cylinders and fountains available on the market. This is to ensure the dispensing of liquid, as desired. This is also to ensure a good watertight seal during transfer and storage, even after the cylinder is removed from the dispenser, which still contains liquid.

[0008] Another important feature of a stopper device is that once the dispenser is removed from the fountain, the orifice of the stopper should be closable and become watertight. If the stopper allowed any external contamination, this could impair effective washing of the cylinder prior to filling. It is also important that the stopper must protect against dust and any bacteriological pollution.

[0009] The stopper device of the present invention is intended to work with containers of the type having a neck to be used in water fountains or water dispensers. The device is also intended for containing drinking water in the container during the storage and transport of the latter and for cooperating with a fountain tube to dispense the liquid. An example embodiment of the stopper of the present invention is used in combination with a capsule having an external skirt which receives the neck of the cylinder, and has an internal duct to pass the fountain tube and support the stopper.

[0010] In an example embodiment, the stopper device according to the invention includes a stopper made of flexible and elastic material, formed from a single piece free of movable parts. The stopper preferably includes a bellows-shaped tapered part with closely set straight walls, which form a slot. The closing and opening of the slot functions as a valve. The slot is formed by two walls, wherein one wall is laid against the other. This prevents the passage of the liquid stored in the container.

[0011] Effective closing of the bellows is assisted by hydrostatic pressure when the cylinder is filled. This action may be reinforced by mechanically increasing the rigidity of

said walls, such as reinforcements exerting a thrust perpendicular to the direction of the walls. Preferably, the reinforcements are positioned at 90° with respect to the slot of the bellows, on either side of the walls.

[0012] In an example embodiment, the stopper is used in combination with a cap having an external skirt portion and an internal duct portion. The lower part of the stopper has at its end an annular flange or seal, the width of which covers the bottom of the capsule between the external skirt and the internal duct. The flange creates a watertight seal at the junction of the neck of the cylinder and the stopper. Moreover, the neck contributes to the seal by pressing the annular flange of the stopper against the bottom of the capsule.

[0013] In an example embodiment, the stopper device according to the present invention includes a tamper feature so that unauthorized prior use of the cylinder can be detected. The bottom of the capsule is equipped, at a location intended to undergo impact during introduction of the tube into the duct, with a daisy-shaped diaphragm. The diaphragm includes petals connected to one another by means of tear lines or the like that can easily be perforated by penetration of the fountain tube. Once perforated, it becomes obvious that the diaphragm has been used. This prevents tampering.

[0014] In an example embodiment of the invention, the stopper includes an upturned neck made from flexible and elastic material. The stopper is housed within the neck and consists of a fixed part surmounted by the bellows-shaped tapered part.

[0015] Other features and advantages of the present invention will become apparent from the following description of the preferred embodiments which refers to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0016] A stopper device according to the invention, used for the neck of a cylinder, is illustrated by way of nonlimiting examples, in the accompanying drawings.

[0017] Figures 1A and 1B show perspective views of the stopper of the present invention.

[0018] Figure 2 is a top view of the stopper.

[0019] Figure 3 is a section through the capsule fitted with a stopper, the latter being presented in section according to line 3-3 of Figure 2.

[0020] Figure 4 is a top view of the stopper and capsule of Figure 3, the slot of which has a fountain tube passing through it.

[0021] Figure 5 is a section taken along line 5-5 of Figure 4.

### **DESCRIPTION OF THE EMBODIMENTS**

[0022] Figures 1A and 1B show an example embodiment of the stopper of the present invention. The stopper 1 is preferably made in one piece from elastic material, such as natural rubber. Preferably, the stopper 1 does not comprise any movable parts.

[0023] Referring now to Figures 2 and 3, the stopper 1 is placed in a capsule 3 which is preferably made from PE plastic. The capsule 3 serves as a receptacle for a neck 5 of a container such as a cylinder that contains water. The capsule 3 includes an external skirt 3a and an internal duct 6 that allows for the passage of a fountain tube 7.

[0024] The lower part of the stopper 1 includes a hollow barrel 2 and terminates in an annular flange 4. The hollow barrel 2 fits onto the duct 6. The annular flange 4 rests on and seals the bottom of the capsule 3. The seal is aided by the end of the neck of the cylinder 5 which sits on the annular flange 4 and holds this part of the seal against the body of the capsule 3.

[0025] The hollow barrel 2 is thus fastened in the capsule both by being fitted onto the duct 6 and by being blocked by the neck 5 of the cylinder.

[0026] The stopper 1 includes a bellows-shaped tapered part 8. This part is made up of two closely set walls 9a, 9b, that are preferably straight, forming a slot 8b. The slot 8b forms a watertight seal when the two walls 9a, 9b are laid or closed against one another.

This is advantageous in an office environment where water leaks are especially harmful.

[0027] The bellows-shaped tapered part 8 functions as a valve. The opening and closing of the valve is actuated by virtue of the elasticity and rigidity of the material and by hydrostatic pressure when the container is filled with a liquid.

[0028] In an example embodiment, the bottom of the capsule 3 includes a daisy-shaped diaphragm 11 having a plurality of petals located at the entrance of the duct 6. In an example embodiment, the petals are joined by tear lines or the like which can easily be perforated, i.e., penetrated, when the cylinder and the stopper 1 are fitted onto the tube 7.

[0029] In an example embodiment, the daisy-shaped diaphragm 11 includes a tamper feature. The daisy-shaped diaphragm 11 is structured and arranged so that once the tube 7 perforates the tear lines and penetrates the petals, it indicates the forced passage of the tube 7. Thus, a used cylinder can not be confused with a new cylinder and, consequently, reuse of the same cylinder cannot pass unnoticed.

[0030] During operation, the cylinder 5 is full of water and carries a capsule 3, including the stopper 1. The tamperproof diaphragm is intact, e.g., the tear lines have not been perforated (Figures 2 and 3). The cylinder 5 is placed onto the fountain, which penetrates and destroys the daisy by the impact being exerted by the tube 7. The water is drawn off when the cylinder 5 is put onto the fountain and the tube 7 is slipped into the slot 8b of the stopper (Figures 4 and 5). The water pours out through apertures 13 of the tube 7 and through the water fountain or dispenser.

[0031] To prevent the water in the cylinder 5 from accidentally penetrating into the space left free outside the tube 7, and from spilling out of the cylinder, the inner wall of the duct 6 includes an annular sealing bead 10.

[0032] With the same purpose in mind, a space or dish is formed inside the capsule 3, so that the water can accumulate there instead of discharging from the cylinder and spilling onto the floor.

[0033] To remove the cylinder 5 from the fountain, the cylinder is lifted off the

tube 7. In an example embodiment, the slot 8b closes in a watertight seal. In other words, the watertight valve closes. Thus, any residue traces of water in the cylinder 5 is prevented from spilling out.

[0034] An advantage of the stopper according to the invention is that it is safe. It does not contain any movable parts. It is easy to use, and consequently carries a low risk of malfunctioning, particularly when the stopper is put into operation and removed.

[0035] Although present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art.